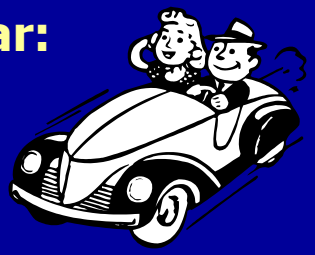
# Hello … welcome to our site regarding Signs, Signals, Roadway Lighting and Pavement Markings.

VDOT is proud of its efforts directed toward helping motorists in their chore of driving, especially those provided through the use of visual aids – Signs, Signals, Roadway Lighting and Markings.

Often we exceed accepted National Standards for these aids and we are continually looking for more or improved methods that will serve all motorists, in particular those from the increasing populace of the older driver.

To review some of our **current** practices, click this car:



To review some of our **planned** practices, click this car:

# *Visibility Initiatives*

## Initiatives Planned to Enhance Motorists' Visibility

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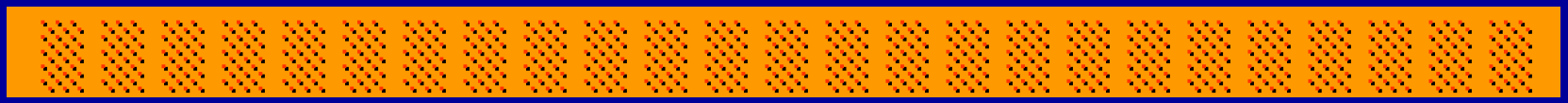
# Background

**VDOT has recently focused on six major initiatives to improve visual prompts for all motorists. Three are now in the implementation phase described under current practices and two are still being evaluated:**

- **Pavement Markings used in Construction Zones that function better in wet conditions**
- **Pavement Markings used in Permanent Applications that function better in wet conditions**
- **Glass curb markers to delineate medians at certain locations**

# Pavement Markings used in Construction Zones (to enhance wet / night visibility)



Pavement markings used in construction zones are typically a tape product placed in a temporary position. These markings do not need to be snowplowable as they are intended to be short lived and easily replaceable.

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# Pavement Markings used in Construction Zones (to enhance wet / night visibility)

- A recent survey identified nighttime visibility, especially in wet conditions, as an area needing attention.
- Wet Reflective markings provide improved guidance during wet roadway – low light conditions
- A draft specification has been developed through collaboration of VDOT and VRTC (Virginia Transportation Research Council at UVA) for temporary use wet Reflective markings.

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Existing Epoxy
Markings
750
Scotch-Lane™ Series 750
4 Months Old
9/ 2/00

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# Pavement Markings used in Construction Zones (to enhance wet / night visibility)

Products classed as “temporary use – wet reflective” pavement markings are relatively new to the marketplace.

VDOT’s **Action Plan** for using these products is:

- Migrate to using Wet Reflective Markings anywhere that construction type markings are currently used.
  - The industry was notified in July of 2002 that we would continue to evaluate new products as they are developed with the intent of specifying them in the near future.
  - Currently, we plan to provide the manufacturers and contractors the proposed materials specification by early 2006.

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# Pavement Markings used in Construction Zones (to enhance wet / night visibility)

## Action Plan (Continued)

- Begin testing this specification on select projects advertised during the Spring of 2006 as a pilot
- Begin advertising projects in the Spring of 2007using this specification (time to conduct R&D and product testing) if pilot is successful

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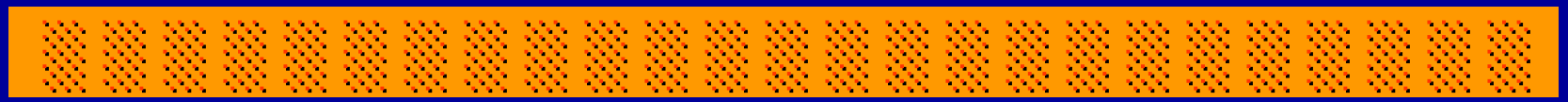
# Pavement Markings used in Permanent Applications (to enhance wet / night visibility)



As stated a few screens back for construction zone markings, a recent survey identified nighttime visibility, especially in wet conditions, as an area needing attention.

Wet Reflective markings provide improved guidance during wet roadway – low light conditions

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# Pavement Markings used in Permanent Applications (to enhance wet / night visibility)

- Pavement markings that perform well in wet / night conditions and that are designed to be permanent are just emerging in the general marketplace.
- These new products are currently under study by VRTC, VPISU (Virginia Tech), and VDOT. Preliminary results indicate that two products are currently available – however, neither of these are snowplowable, a feature that is required in Virginia.

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# Pavement Markings used in Permanent Applications (to enhance wet / night visibility)

- The 3M Company has stated they will have a new product on the market soon.
  - Similar to another product currently used in Virginia which is snowplowable.
  - This product will not be applicable for use on existing asphalt surfaces.
  - A test site was installed on I-64 in Fall 2005 to be evaluated.

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# Permanent Pavement Markings for Wet / Night Conditions

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# Pavement Markings used in Permanent Applications (to enhance wet / night visibility)

## Action Plan:

- Allow the manufacturers time to complete current R&D and to develop snowplowable wet reflective permanent markings.

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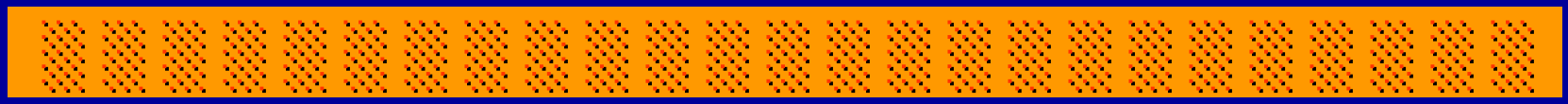
# Glass Curb Markers



Certain curbs, such as medians that transition or that have reverse curves, would be easier to navigate during darkness hours if they were easier to identify. Various markers and markings have been used for this purpose with some success. However a new product has come to the market that deserves further evaluation.

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# Glass Curb Markers

VDOT has been working with the developer of a hardened glass reflective curb marker, evaluating the produced effect and durability of the product. The marker is intended to provide positive guidance near and along medians and other curbed locations where extra guidance may be needed. Odd shaped curbs, curbs with transitions or curbs having reversing curves are target areas.

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# Glass Curb Markers

In-field evaluations have been performed in both the Hampton Roads area and in the Northern Virginia area.

Both Districts report that the product is performing as the manufacturer predicted both in terms of durability and motorists' benefit. It produces reflective light in a 360º viewing field.

This product may prove to be proprietary (research is on going) but because of its benefits to motorists in certain instances, VDOT intends to select new construction projects and retrofitting projects where this product will have the most impact. A specification is being developed for this purpose.

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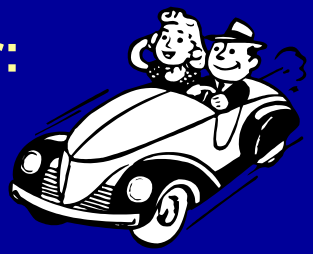
To review some of our
current
practices, click this car:



OR

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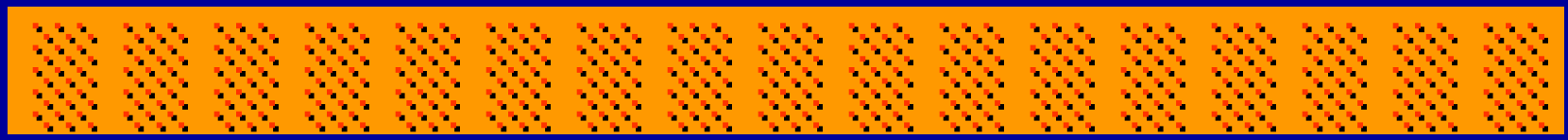
VDOT Virginia Department of Transportation

# *Visibility Practices*



## Practices Currently Used to Enhance Motorists' Visibility

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# Background

VDOT has developed many initiatives over the past two decades to improve visual prompts for all motorists, particularly motorists from the older population. We have and continue to provide Traffic Control and Safety Devices that are above the standards set on the national level.

Three of the six initiatives studied in recent years are in the implementation phase and will be installed on new projects according to guidelines that have now been established.

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# Traffic Signals 

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# Traffic Signals

- Use of 12” (lens) traffic signal displays when standards allow for 8”

# Traffic Signals

Use of 12” (lens) traffic signal displays when standards allow for 8”

Use of full circle signal displays in lieu of arrows where practical

# Traffic Signals

Use of 12” (lens) traffic signal displays when standards allow for 8”

Use of full circle signal displays in lieu of arrows where practical

Use of black backplates surrounding the signal cluster

As can be seen, a circular signal face has more “punch” than an arrow does. We use circular indications where possible.

Backplates increase the visual target size of signals and provide more contrast against the bright sky.

12 ” signal faces are 50% larger than those typically allowed.

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# Traffic Signals

Use of 12” (lens) traffic signal displays when standards allow for 8”

Use of full circle signal displays in lieu of arrows where practical

Use of black backplates surrounding the signal cluster

Use of more signal clusters than required

Typically, VDOT will add extra signal clusters for additional through lanes of traffic, even though national standards allow for just two clusters in the display for through traffic.


# Traffic Signs


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# Traffic Signs


- Use of improved lettering and a more highly reflective sheeting on guide signs

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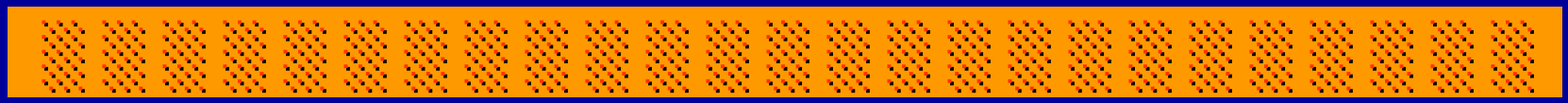
# Clearview® Font and Brighter Retroreflective Sheeting



The use of a more legible font and brighter sheeting material improves conspicuity and legibility

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# Clearview® Font and Brighter Retroreflective Sheeting

- National studies, conducted over a ten year period, indicate that the privately developed font, Clearview®, is more legible to all motorists
  - 16% more legible to older motorists than are the current fonts sanctioned by the FHWA
  - Indication is that Clearview® used with a highly retroreflective legend on retroreflective or highly retroreflective background materials provides additional legibility

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# Clearview® Font and Brighter Retroreflective Sheeting

- Two states, Pennsylvania and Texas, have begun programs to transform their guide signs to Clearview® fonts

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# Comparison – Standard Highway Font to Clearview Font


Standard Highway Lettering

Clearview® (normal spacing)

Clearview® (reduced spacing)

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# Michigan Side by Side Comparison

# Clearview® Font and Brighter Retroreflective Sheeting

- Guidelines have been established for the implementation
- VDOT will make sign legends using Clearview® font and a highly retroreflective sheeting on all new guide signs being installed and on those existing guide signs being replaced or refurbished.

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# Traffic Signs


Use of improved lettering and a more highly reflective sheeting on all guide signs

Increased use of overhead and/or advanced ground mounted street name signs at signalized intersections

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**Mounted high and with larger letters, overhead street name signs at critical intersections are becoming more prevalent.**

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**Where major traffic generator routes intersect, the practice of installing advance street name signs is becoming an expected service. VDOT has developed standard signs to address this.**

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# Traffic Signs


Use of improved lettering and a more highly reflective sheeting on all guide signs

Increased use of overhead and/or advanced ground mounted street name signs at signalized intersections

Use of fluorescent sign sheeting for construction work zones and pedestrian-school-bicycle signage

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**Fluorescent materials add to the attention attracting value of certain signs**

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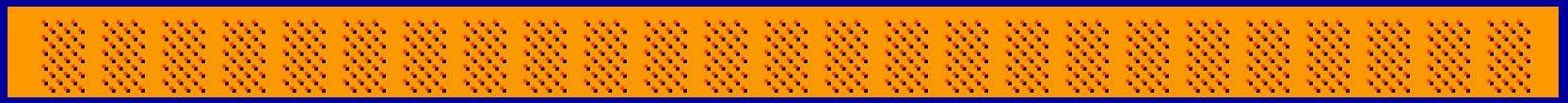
# Pavement Markings - Markers



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# Pavement Markings - Markers

- Use of pavement markers on Interstate highways and other high volume roads

Markers are used to augment markings. They are very expensive, thus limiting their use to selected routes. Typically, they are found on high volume and high speed routes where their benefits offset their cost.

Notice how the pavement markings in this photo disappear in the distance, but the markers carry on.

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# Pavement Markings - Markers

Use of pavement markers on Interstate highways and other high volume roads

- Installation of markings on roads having lower volumes than the values set at the national level

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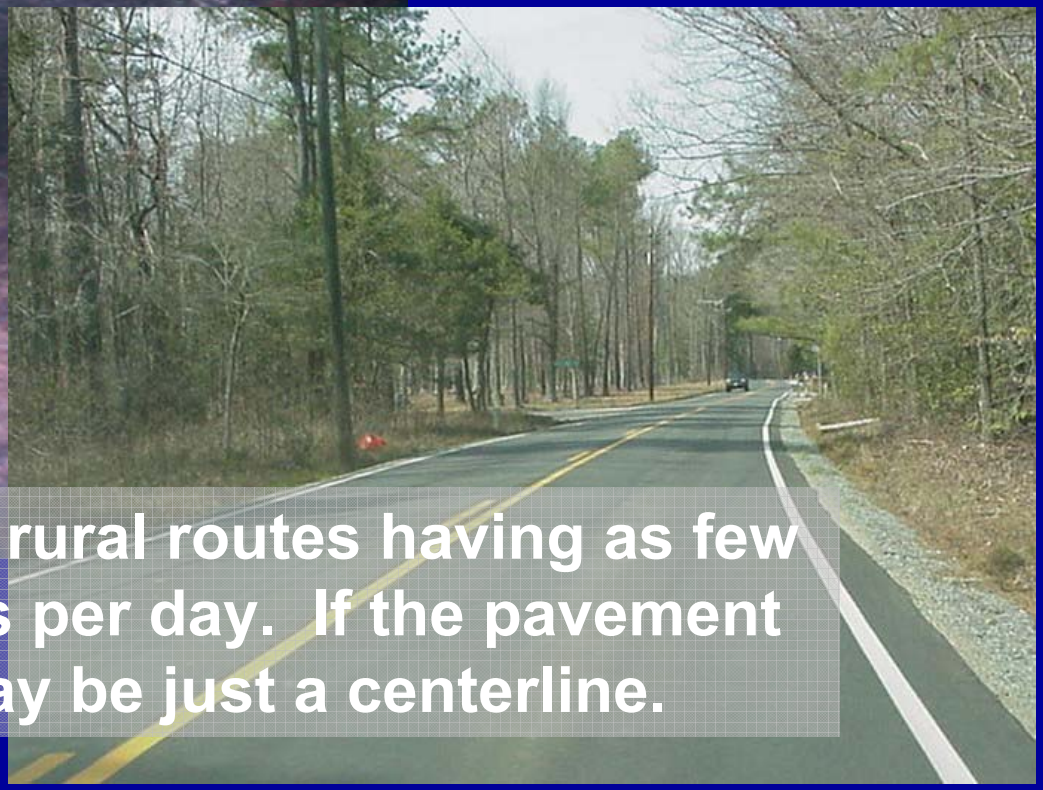

Virginia marks rural routes having as few as 500 vehicles per day. If the pavement is narrow, it may be just a centerline.

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# Pavement Markings - Markers

Use of pavement markers on Interstate highways and other high volume roads

Installation of markings on roads having lower volumes than the values set at the national level

Use of 6 inch wide pavement markings at some locations (national standard is 4 inches)

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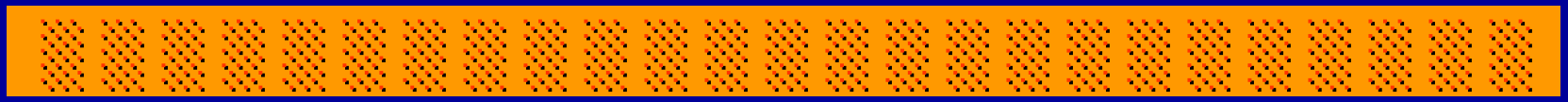
# 6 Inch Pavement Markings



**The use of wider lines improves target value**

# 6 Inch Pavement Markings

Though there is no statistically significant reduction in crashes from the use of wider markings, improved visibility (more target value) is often sighted as the surrogate for safety.

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# 6 Inch Pavement Markings

Due to increased target values achieved by installing six inch markings, VDOT is converting to the use of 6 inch lines on the following roads:

- Interstate highways
- High volume, limited access Primary routes other than short “by-pass” routes

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# 6 Inch Pavement Markings

(continued):

- Other routes having high speed and high volumes as determined by engineering review

A Memorandum has been issued establishing guidelines for a migration strategy for the use of six inch pavement markings.

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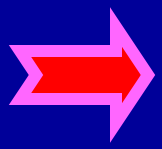
# Pavement Markings - Markers

Use of pavement markers on Interstate highways and other high volume roads

Installation of markings on roads having lower volumes than the values set at the national level

Use of 6 inch wide pavement markings at some locations (current width is 4 inches)



Use of a highly retroreflective marking material on limited access highways and certain other routes

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High quality markings, while costing more, provide better durability and more retroreflectivity.

# Pavement Markings - Markers

Use of pavement markers on Interstate highways and other high volume roads

Installation of markings on roads having lower volumes than the values set at the national level

Use of 6 inch wide pavement markings at some locations (current width is 4 inches)

Use of a highly retroreflective marking material on limited access highways and certain other routes

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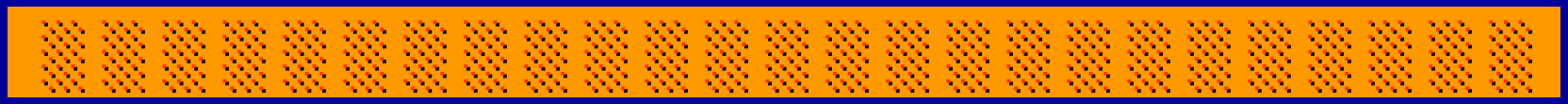
# Pavement Markings - Markers

(continued)

- Horizontal Signs (a form of pavement markings) are used to give additional guidance information

# Horizontal Signs
# (Pavement Markings)



**Horizontal signs are actually a form of pavement markings that simulate signs.**

**Usually these are *Route Shields* and *Word Messages.***

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# Horizontal Signs
# (Pavement Markings)

**VDOT has recently completed a one year evaluation of horizontal signs at two locations within the State to determine the following:**

- **Durability under snowplowing operations**
- **Color retention**
- **Retention of skid resistance characteristics**

**The results were positive. Locations will be evaluated by our District Traffic Engineers to determine sites where these "signs" will best aid the motorists.**

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**This is Route 301 north of Richmond where left-hand movements are used to access Interstate 95.**

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As can be seen, based on the vertical sign in place, the lane assignments at this location (in the Winchester area) are out of the ordinary. Horizontal signs are providing additional clarity.

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# Roadway Lighting

# Roadway Lighting

- Use of lighting in congested areas such as complex interchanges and where interchanges are closely spaced

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Lighting has been added to many high volume interchange areas such as the interchange of I-95 and I-64 in downtown Richmond, and along some high volume routes like I-95 in Fairfax Co. Lighting aids the motorist in his/her ability to discern activity in all lanes and on the shoulders as opposed to the limited area illuminated by headlights.

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# Roadway Lighting

Use of lighting in congested areas such as complex interchanges and where interchanges are closely spaced

- Use of lighting at certain traffic signalized intersections

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Lighting at intersections serves many purposes. Not the least of these is the illumination of pedestrians so that vehicle operators might see them, even when they are outside of the vehicle's headlamp range.

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